Final Report, Office of Naval Research Grant N00014-95-1-1063

Research Described in Proposal Entitled

Graduate Research Training in Coastal Oceanography and Mixing

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Summary

This AASERT program award was used to partially fund the graduate education of Miles Sundermeyer in the MIT/WHOI Joint Program in Oceanography. It was also used to fund research performed by him while he was a student. Miles earned the PhD. degree in September, 1998. The topic of his research was lateral dispersion of substances in the ocean. The research in the second part of the two-part thesis was funded by this grant and concerned lateral dispersion over the New England continental shelf. The parent grant for this AASERT award was N00014-95-1-0633 entitled *Tracer Studies of Mixing in Stratified Coastal Waters.*

Activity

Miles was a student in the WHOI Physical Oceanography Department, although the field portion of his research was associated with grant N00014-95-1-0633 to James Ledwell and Tim Duda of the Applied Ocean Physics and Engineering Department. This grant is a component of the ONR Coastal Mixing and Optics Program. Miles' thesis committee was composed of James Ledwell and Kenneth Brink (co-supervisors), Glenn Flierl, Wayne (Rocky) Geyer, James Price and Paola Rizzoli. His defense was chaired by John Toole.

Part One his thesis covered dispersion in the eastern North Atlantic Ocean and was performed prior to this award and is not discussed further. Part Two described field results obtained under this and the awards. The field work was done aboard the RV *Oceanus* approximately 120 km south of Woods Hole during three trips: September 1995, September 1996, and August 1997. The field work consisted of dye injection and tracking experiements, plus supporting physical measurements. Five dye clouds were injected and surveyed as they grew over periods of five days each. The thesis showed the field results, discussed the physics of published lateral dispersion mechanisms, described a new mechanism concerning baroclinically adjusting density anomalies, and evaluated the consistency of each mechanism with the observations.

Miles' research leading up to the thesis included much software composition and data reduction. He analyzed dye-cloud dispersal data and estimated the disersion rates of five experiments; four were comparable to each other in nature and were reported in detail in the thesis. He helped organize a large amount of data associated with the parent grant, faciliting progress toward the other goals of the grant such as quantifying cross-isopyncnal (vertical) mixing rates and mingling of water-masses at the shelf-break front.

Suppported or Partially Supported Publications

Sundermeyer, Miles Aaron, 1998. *Studies of Lateral Dispersion in the Ocean.* Ph.D. Thesis. MIT/WHOI, 98-14.

Sundermeyer, M. A. and J. F. Price, 1998. Lateral Mixing and the North Atlantic Tracer Release Experiment: Observations and Numerical Simulations of Lagrangian Particles and a Passive Tracer, J. Geophys. Res., 103, 21,481-21,497.

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